



CCSF 1994 NPDES Permit Program

ATTACHMENT COVER SHEET

Attachment # 2 - Demonstration that SF has complied with section I.C. 1 of the CSO Control Policy which allows grandparenting for the purposes of not preparing a (new) CSO long-term plan

Date: 3/14/94

CCSF 1994 NPDES Permit Program

Cover Sheet - discard before submittal

Attachment # 2 - Demonstration that SF has complied with section I.C. 1 of the CSO Control Policy which allows grandparenting for the purposes of not preparing a (new) CSO long-term plan.

Responsibility: Fred K., Dave Jones,

Draft Date: 3/14/94

Authors: Dave Jones (415) 554-8200 - cost and completion data
Fred Krieger (510) 832-2233, FAX 832-2237 - text

File Names: Text - GRANDPA.DOC (Word for Windows)
Table (Total Costs and Wet-Weather Costs to Date) -
CSOBASIN.WQ1 (2/18/94 on Dave's machine)

Notes:

1. This revision is based on the meeting 3/11.
2. I've added a new section E. **Program Completion Based on Pollutant Removal.** The old section E becomes section F. The comparisons used to show substantial completion are
 - % of dollars spent
 - % of acreage where runoff is captured by storage/transport and doesn't overflow.
 - % of pollutants removed based on ultimate removal.
3. I've made several references in the text to the appendix which is Dave's file WST-CSO which goes into the background for establishing the CSO control requirements.

San Francisco Classification as Having Substantially Completed CSO Control Facilities

A. Summary

The *Combined Sewer Overflow Control Policy* (EPA, 1993 draft, 1994 final [planned]) provides that CSO control programs which are substantially complete are not covered by the initial planning and construction provisions of the *Policy*. This "grandfathering" provision is intended to prevent CSO programs which are substantially complete from having to start over again based on the new policy. To qualify for this provision, it must be determined that water quality standards are or will be attained.

This document demonstrates how San Francisco qualifies for the classification of having substantially completed its CSO control program. It also describes how the facility planning was based on the goal of meeting water quality standards. Appendix A includes an historical review of the water quality issues that formed the basis for the San Francisco program. A separate Attachment addresses compliance with water quality standards ("presumptive" approach) as outlined in the *Policy*.

Although San Francisco qualifies for the exemption from the planning and construction provisions of the policy, the City has, in fact, completed the required construction as specified in the *Policy*. This implementation of the *Policy's* construction requirements is described in the document discussing the Presumptive Approach.

B. Introduction and Purpose

The Clean Water Act (CWA) established the National Pollutant Discharge Elimination System (NPDES) permit program. All point source discharges to waters of the U.S. must have permits issued under this program. The Clean Water Act also established the criteria which the U.S. EPA and the states use in issuing permits to these discharges. Essentially, the discharges have to comply with two sets of requirements:

- Technology-based minimum requirements which apply to all dischargers of a specified class (CWA section 301(b)(1)(A) and (B)).
- More stringent effluent limits if needed for the discharge to meet local water quality standards (CWA section 301(b)(1)(C)).

Previous permits issued by EPA Region 9 and by the California Regional Water Quality Control Board to San Francisco have required the construction of extensive facilities to control the combined sewer overflows and thereby comply with the requirements of the Clean Water Act.

Construction of control and treatment facilities for combined sewer discharges has not generally been required throughout the U.S. Most of the effort of the EPA and state permit programs has been directed at controlling dry weather discharges rather than the intermittent storm flow discharges. Consequently, EPA in 1989 issued the *National CSO Strategy*. This strategy was intended to initiate planning and construction for the many uncontrolled CSO discharges. The Strategy was modified and expanded upon with the issuance in 1993 of the draft *Combined Sewer Overflow Control Policy*.

In order to not unfairly impact those communities which had already made substantial investments in planning and implementing CSO control programs, the *Policy* included a provision to exempt them from the planning and construction provisions of the *Policy*. More specifically, in Section I.C. **Effect on Current CSO Control Efforts**, the *Policy* states:

EPA recognizes that extensive work has been done by many Regions, States, and municipalities to abate CSOs. As such, portions of this Policy may already have been addressed by permittees' previous efforts to control CSOs. Therefore, portions of this Policy may not apply, as determined by the permitting authority on a case-by-case basis, under the following circumstances:

1. Any permittee that, on the date of publication of this final Policy, has completed or substantially completed construction of CSO control facilities that are designed to meet WQS and protect beneficial uses, and where it has been determined that WQS are being or will be attained, is not covered by the initial planning and construction provisions in this Policy; however, the operation and maintenance and monitoring provisions continue to apply. If, after monitoring, it is determined that WQS are not being attained, the permittee should be required to submit a revised CSO control plan that, once implemented, will attain WQS.

Consequently, the following material reviews the status of the San Francisco program to determine if San Francisco qualifies for this provision. To establish that San Francisco has substantially completed control facilities which will likely provide for compliance with water quality standards the following sections examine:

- Program completion based on program costs.
- Program completion based on per cent of City acreage with control facilities.
- Program completion based on per cent of pollutants removed.
- Determination of attainment or likely attainment of water quality standards.

C. Program completion based on program costs.

One method of assessing the status of a large construction program is to review expenditures. In this case we compare the total expected costs of the San Francisco wastewater control facilities versus the expenditures to date. Table 1 - *Master Plan Projects, Cost Estimates and Expenditures to Date* provides this information.

Table 1
SAN FRANCISCO CLEAN WATER ENTERPRISE
Master Plan Projects⁽¹⁾
Cost Estimates and Expenditures to Date

<u>Current Projects</u> (All costs in \$000's)	<u>Estimated Costs</u>	<u>Expended By Dec. 31, 1993</u>
Bayside Core (completed)	\$ 409,350	\$ 409,350
Westside Core (completed ⁽²⁾)	345,496	344,516
Oceanside Plant	256,217	240,341
Southeast Facilities	354,344	161,803
Richmond & Lake Merced Transport	<u>81,586</u>	<u>33,922</u>
Total Master Plan Projects	\$1,446,993	\$1,189,932

⁽¹⁾ Does not include Bayside Discharge Improvements.

⁽²⁾ Difference in costs (est. vs. expended) due to all accounts not being closed out.

Source: Department of Public Works.

As can be seen from the Table, 82% of the expected costs for the program have been expended. The City estimates that approximately three fourths of these costs can be attributed to the wet weather portion of the facilities. A precise apportionment of the costs is not possible since many of the facilities have dual, wet and dry weather, functions.

As shown in Table 1, San Francisco has substantially completed the wastewater projects needed to control combined sewer overflows. The program is continuing and all projects are expected to be complete by 1996.

D. Program completion based on per cent of City acreage with control facilities.

Another way of looking at the progress of the wastewater program is to examine the percentage of the surface area of the City that is controlled. Control means that storm water runoff into the combined sewers is directed to either the sewage treatment plants or to the storage/transport (for later treatment at the treatment plants or for discharge after flow-through treatment). "Uncontrolled" sewers are those where storm flows cause untreated combined sewer overflows (CSOs) into Bay or ocean waters. The goal of the San Francisco program is to completely eliminate the uncontrolled CSOs.

Table 2 - CSO Basins measures program completion by determining the percentage area of the City in which storm runoff is captured and controlled as describe above. The term "runoff factor" refers to the percentage of the specified area that is paved or roofed. Lawns and parks are excluded from this percentage since they normally do not contribute to runoff. As shown in Table 2 on the following page, most of the City's surface area is now controlled:

	City acreage Percent controlled
Westside system	80
Bayside system	68
Citywide Totals	72

Table 2

CSO BASINS

	Connected Area (Ac.)	Runoff Factor	Effective Area (Ac.)	Percent/ System	Percent Controlled
WESTSIDE SYSTEM					
Lake Merced Transport	1,581	0.60	949	18.79%	100%
Westside Transport	5,574	0.55	3,076	60.91%	100%
Richmond Transport	2,010	0.51	1,025	20.30%	0%
Sub-total Westside	9,165	0.55	5,050	100.00%	80% *
BAYSIDE SYSTEM					
Northshore OC	2,189	0.71	1,565	15.09%	100%
Channel OC	5,327	0.71	3,759	36.23%	100%
Mariosa	235	0.64	150	1.45%	100%
Islais Creek OC	5,733	0.60	3,440	33.16%	5%
Hunters Point	62	0.60	37	0.36%	100%
Yosemite-Fitch	1,350	0.62	831	8.01%	100%
Sunnydale	986	0.60	592	5.70%	100%
Sub-total Bayside	15,882	0.65	10,374	100.00%	68% *
CITYWIDE TOTALS	25047	0.62	15,424		72% *
PERCENT OF CSO EFFECTIVE AREA WITH T/S FACILITIES COMPLETED					71%

* Weighted on the basis of effective areas
Percent completed as of 3/1/94

File = C:\DATA\NPDES\CSOBASIN.WQ1

Compiled by DAJ Last Updated

02/18/94

14:26:11

E. Program completion based on per cent of pollutants removed

The wastewater program's progress can be measured by its success in removing pollutants carried in the wastewater. By removal, we mean removing them from the waste stream so that they do not enter the receiving water. The following figures compares San Francisco's current pollutant removal status with the expected removal data when the program is complete. The comparison is based on pounds of suspended solids removed from the storm flows which were originally discharged at the shoreline as combined sewer overflows. Measurements of total suspended solids (TSS) are used for this comparison because many of the pollutants of concern are in suspended form and because suspended solids themselves can have an adverse impact on the receiving waters.

	TSS discharged	TSS removed	% ultimate removal
Pre-1975	3572	0	0
Mar-94	1063	2509	80%
Post-1996	438	3134	100%

All figures are tons per year

As can be seen from the figures above, the program currently is achieving approximately 80% of the pollutant removal that it will ultimately achieve.

F. Determination of attainment or likely attainment of water quality standards

In order to meet the *Combined Sewer Overflow Control Policy's* requirements for exemption from the planning and construction provisions, a pre-*Policy* CSO control program such as San Francisco's must also demonstrate that water quality standards are being attained or will be attained by the facilities being constructed. The *Policy* provides two methods for demonstrating compliance with water quality standards. One of these methods is the "presumptive" approach and a separate Attachment addresses San Francisco's compliance with this approach. San Francisco initiated its program long before the *Policy* was developed and so the following material summarizes the water quality standards used as the basis for the San Francisco program.

The water quality standards which formed the basis for the wastewater program to control the combined sewer discharges from San Francisco are the *Water Quality Control Plan, San Francisco Bay Basin, Region 2* (Basin Plan) and the *Water Quality Control Plan, Ocean Waters of California* (Ocean Plan).

The basis of the Master Plan wastewater facilities has always been the goal of achieving water quality standards. This policy is evident in past permits and orders issued by Region IX and the Regional Board to San Francisco for control of the CSOs. For example, when concerns were raised regarding the cost of CSO controls, the Regional Board released a review which included the following statement (Dalke, December 7, 1979):

The Regional Board has long recognized the need to control combined sewer overflows in order to: reduce the public health risks associated with water contact recreation and consumption of shellfish; increase recreational opportunities by reducing days that beaches are posted with warning signs; reduce the deposition of sewage solids on beaches, and reduce the adverse affects on fish and aquatic life.

The discussed below, the water quality standards embodied in the Basin Plan and Ocean Plan were the basis for establishing the allowed treated overflow frequencies for each zone around the periphery of the City. These frequencies then became the design basis for the wastewater control facilities. When the wet weather facilities are complete in 1996, the City will be in complete compliance with the WQS.

Ocean Plan - The *Ocean Plan* sets the water quality standards for combined sewer discharges from the Westside of San Francisco. There are three types of Westside discharges: (1) Oceanside treatment plant discharges of combined sewer flows, (2) "decant" discharges which go from the storage/transport direct to the Ocean Outfall, and (3) discharges from the storage/transport to the shoreline.

1. **Oceanside treatment plant discharges of combined sewer flows** - These wastewaters will receive treatment to the secondary treatment standards. The Ocean Outfall releases

these treated flows through a diffuser over four miles from shore. Thus the discharge is into federal waters. The Ocean Plan sets water quality standards for state waters which extend from the shore to three miles offshore. The City's ongoing monitoring program has not identified any violations of water quality standards in the state waters from the Ocean Outfall discharge.

The Oceanside treatment plant began operations in January 1994. Prior to this time, the discharge out the outfall consisted of primary-treated wastewater from the Richmond-Sunset treatment plant. Since this primary-level discharge did not contribute to the violation of water quality standards, it is even less likely that the secondary-treated wastewater will cause any violations of water quality standards.

2. "Decant" discharge from the storage/transport through the Ocean Outfall - These wastewaters receive flow-through treatment within the storage/transport and discharge through the Ocean Outfall diffuser. The wet weather monitoring referred to above has not detected any violations of state water quality standards from any of the discharges through the Ocean Outfall. Most of the flow through the Outfall consists of wastewater treated at the treatment plant. As discussed above, with the start-up of the new Oceanside plant the discharge loading from the Outfall will further decrease and lessen the potential for impacts on water quality standards.

3. Shoreline discharges from the storage/transport - These discharges are within State waters and the Ocean Plan directly applies. Prior to discharge, these flows have received treatment within the storage/transport consisting of baffling to remove floatables and the settling of solids. The storage/transport were designed to provide this treatment in order to comply with the Ocean Plan's General Requirements for Management of Waste Discharge to the Ocean (Chapter III):

B. Waste discharged to the ocean must be essentially free of :

1. Material that is floatable or will become floatable upon discharge.
2. Settleable material or substances that may form sediments which will degrade benthic communities or other marine life.

Pursuant to Chapter VI - General Provisions, Section F, State Board Exceptions to Plan Requirements, the shoreline discharges have received an exception to the water-contact standards (Chapter II. A.1.) and to the Table B limits (Chapter IV.). This exception was granted by the State Board and approved by EPA because of the impracticability of shoreline discharges from a combined sewer system meeting these requirements.

The allowed (treated) overflow frequency for the Ocean side has been set by the Basin Plan at 8 per year (long-term average). Most overflow points are now meeting this

limit. When all controls are in place in 1996, all locations will be in compliance with the standard.

Basin Plan - The *Basin Plan* sets the water quality standards for combined sewer discharges from the Northshore and eastside of San Francisco (Bayside). There are three types of Bayside discharges: Southeast treatment plant discharges of combined sewer flows, (2) North Point wet weather plant discharges, and (3) discharges from the storage/transport to the shoreline.

1. **Southeast treatment plant discharges of combined sewer flows** - These are the incremental flows above the dry weather loading which will receive treatment to the secondary treatment standards. These treated flows are discharged through a diffuser to San Francisco Bay.

2. **North Point wet weather plant discharges to the North Shore area** - These storm flows receive primary-level treatment at this wet weather treatment facility. The treated flows are discharged near the shoreline at the northeast corner of the City.

3. **Shoreline discharges from the storage/transport** - Prior to discharge, these flows have received treatment within the storage/transport consisting of baffling to remove floatables and the settling of solids.

The storage/transport and the North Point plant are designed and operated to provide this treatment in order to comply with the following Water Quality Objectives (Chapter III):

Floating Material

Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.

Settleable material

Waters shall not contain substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses.

The Regional Board has the ability to adjust the objectives on a case-by-case basis as noted in Chapter III:

Compliance with water quality objectives may be prohibitively expensive or technically impossible in some cases. The Regional Board will consider modification of specific water quality objectives as long as the discharger can demonstrate that existing beneficial uses will be protected and such a

modification will otherwise be consistent with the State's Policy with Respect to Maintaining High Quality Waters in California.

The Basin plan specifically addresses San Francisco in Chapter IV because of its "uniqueness within the region because of its combined sewer system." The Basin Plan notes the allowable (treated) annual overflows for the Bayside. These overflow frequencies are based on a long-term average and formed the design basis for the program:

- North Shore area 4
- Channel Basin area 10
- Yosemite Basin area 1

These shoreline discharge limits are reflected in the existing permits and the City's control facilities either currently comply or will comply with these allowed shoreline discharge frequencies when the ongoing construction program is complete.

As noted previously, the Basin plan also set the shoreline discharge frequencies for the Ocean side:

- Ocean beaches 8

Appendix A provides additional information on the water quality issues which historically influenced the San Francisco wastewater program.

G. Conclusion

The San Francisco wastewater program which began with the Master Plan EIS/EIR in 1974 is now substantially complete. The water quality standards which formed the basis for the Master Plan will be attained with completion of the facilities in 1996. Also, as shown in a separate Attachment, the program complies with water quality standards using the approach outlined in the *CSO Control Policy*. Consequently, the San Francisco program qualifies for the *CSO Control Policy's* classification under Section I.C. as being substantially complete and exempt from the planning and construction requirements.

*San Francisco Classification as Having
Substantially Completed CSO Control Facilities*

Appendix A

**Water Quality Issues in
Establishing CSO Control Requirements for the
Westside Transport**

The following are the public health and ecological considerations used to derive the CSO control requirements for the Richmond Transport project CSO structures:

WASTEWATER MASTER PLAN EIS, MAY 1974

The Master Plan EIS contains a discussion of the costs and benefits (mass emission reductions) for achieving citywide overflow control requirements of 8, 4, 1, and 0.2 overflows per year. The summery section contains the statement that "The exact level of [overflow] control that is to be selected will be determined during special detailed studies for the three major watersheds." (page 4) The discussion of public health issues is limited to a discussion of coliform standards, beach posting policy following overflows, and general statements to the effect that minimizing the yearly volume of overflows will improve the sanitary quality of the receiving waters. The discussion of the (marine) ecological impacts of CSO is equally perfunctory. (EPA 1974)

RWQCB BASIN PLAN REPORT APRIL 1975

The Basin Plan discussion of the San Francisco CSO problem expresses the primary concern that "...recreational areas should receive reasonable protection, certainly for the [April to October] recreational season." (page 5-31) and concluded with a recommendation of between 1 and 8 allowable overflows per year for the Westside "...subject to specific requirements" (fig. 5-5 & fig. 5-7). The Basin Plan contains a further recommendation that the city undertake a revised overflow control study for each zone, "...especially those areas that incur high recreational usage." (page 5-35) The Basin Plan discussion of ecological impacts is limited to comparing mass emission rates for various levels of CSO control and wet-weather treatment processes.

NPDES PERMIT CA0038415 (RWQCB ORDER 76-23), MARCH 1976

The 1976 NPDES Permit for the Westside CSO structures contained a CSO control requirement of 1 overflow per year for all Westside CSO structures with the provision that the Board will consider amending the permit to "... further reduce the frequency of discharge" after the city completes the revised overflow control study recommended in their Basin Plan. That permit required the city to develop zone by zone recommendations for allowable overflows, overflow outfall extensions and overflow mitigation

measures such as screening beach cleaning and disinfection and submit its initial findings and recommendations to the RWQCB by July 1 1977.

REVISED OVERFLOW CONTROL STUDY DECEMBER 1978

In December 1978, we submitted the Revised Overflow Control Study for the Westside Transport, and recommended a uniform CSO control level of 8 overflows per year for all Westside CSO structures. Our recommendation was based on a cost-benefit analysis comparing marginal costs versus marginal benefits (mass emission reductions) which indicated that the cost/benefit ratio increased significantly when allowable overflows were deduced below the 8 per-year level. (Wastewater Program 1978)

In January 1979, the RWQCB accepted our recommended CSO control frequency of 8 per year and they amended the NPDES permit accordingly (RWQCB Order 79-12). In March 1979, the SWRCB concurred in the change in CSO control requirements and granted the requisite exceptions to the Ocean Plan for the allowable overflows (SWRCB Order WQ 79-16).

PUBLIC HEALTH AND ECOLOGICAL CONCERNS REGARDING CSOs

As a consequence of concerns expressed by a member of the RWQCB, we asked both the City's DPH and the state DHS to look at their epidemiological data to see if there were any indications that the CSOs had caused any health problems. Our DPH could not find any reported cases of enteric diseases in 25 years of data that appeared to be overflow related. They also did a statistical analysis comparing the morbidity rates for the 3 major waterborne enteric diseases (salmonellosis, shigellosis and hepatitis A) with rainfall. This analysis failed to show a correlation with rainfall i.e. CSOs. (Silverman and Dritz, 1978)

California DHS also reported that they could find no evidence of overflow related disease in their records but noted that "...reports of disease from polluted recreational water are really quite rare." DHS recommended that "Nonetheless, reasonable efforts should be made to minimize the risk that San Francisco Bay waters may pose to the public's health." (Werner 1978)

We also hired Professor Robert Cooper of UC Berkeley to a risk assessment of the risk of illness from swimming near a CSO structure during and immediately following overflows. Based on BWPC shoreline coliform data, City DPH morbidity statistics and published infective dose estimates, Cooper predicted risks of illness of between 1 in 100,000 to 1 in 10 billion for pathogenic bacteria. However Cooper was unable to assess risks for viral illnesses due to lack of data on infective doses and lack of morbidity data for Norwalk-type illnesses. (Cooper 1979)

We surveyed winter water contact recreational uses of the Ocean shoreline from Thorton Beach State Park to the Golden Gate Bridge and compiled available data from other agencies on shoreline recreational usage. The Programs data includes data on type of uses along each major sector of the shoreline. (Wastewater Program 1978 and ESA 1978)

We hired Jim Sutton, an invertebrate zoologist, to survey the shoreline to see if there were any major aberrations in the intertidal community composition near any of the Westside CSO structures and

prepare a discussion of likely impacts of CSOs on the intertidal fauna. Sutton could not find any obvious impacts and he concluded that significant impacts were unlikely because of the low acute toxicity of the overflows, their transitory nature and the excellent dispersion at all Westside CSO structures. (Sutton 1978)

Silverman and Dritz 1978 and Werner 1978 were initially published as Appendices to the Westside Revised Overflow Control Study. Sutton 1978 was submitted separately to the RWQCB prior to their January 1979 hearing. Both Braff, City DPH and Sutton testified at that hearing.

WESTSIDE TRANSPORT EIR JULY 1977, AMENDED AUGUST 1979

The 1977 Westside Transport EIR is based on the Best Apparent Alternative to achieve the then effective CSO control requirement of one overflow per year. The bulk of this EIR was focused on construction impacts. The discussion of Public health and ecological issues of the overflows are essentially limited to comparing costs with volumetric reductions in CSOs for the Master Plan frequencies of 8,4,1 and 0.2 overflows per year. There is not specific mention of shoreline impacts in the Richmond Transport project area. (City Planning 1977)

The 1979 EIR Amendment focuses on the project changes resulting from the RWQCB's action in changing the Westside CSO control requirement to 8 overflows per year. The public health and ecological issues presented to the RWQCB in January 1979 are discussed in the text. Silverman and Dritz 1978 and Sutton 1979 are included in the appendices along with newer CWP data on overflow characteristics including toxicants. The EIR Amendment does not specifically address the Richmond Transport impact area, however, both the Sutton survey and our beach 1978 beach usage survey includes material specific to this area. (City Planning 1979)

Attachments: List of References

Prepared 2/18/94 DAJ

File C:\DATA\WST\WST_CSQ.WP

LIST OF REFERENCES

Environmental Protection Agency, Department of City planning, J.B. Gilbert Assoc. and Spectrum Northwest, Final Environmental Impact Report and Statement - San Francisco Wastewater Master Plan, May 1974

Regional Water Quality Control Board, with Brown and Caldwell, Water Resources Engineers, Yodder-Trotter and Orlab, Water Quality Control Plan Report - San Francisco Bay Basin (2), April 1975

San Francisco Wastewater Program, Westside Wet-Weather Facilities - Revised Overflow Control Study, December, 1978

Silverman Mervin E. and S. Dritz, Enteric Disease Incidence in San Francisco 1964 - 1978, published in Wastewater Program 1978 *ibid.*

Werner S. B, California Department of Health Services - Infectious Disease Section, letter to Selma Dritz MD, December 6, 1978

Cooper Robert, Public Health Aspects of San Francisco Sewage Overflows, Environmental Science Associates, November 1978

Environmental Science Associates, Recreational Uses Along San Francisco Shoreline Part 1. Bay Bridge to Mussel Rocks, November 1978

Sutton James E, Reconnaissance Surveys of Ocean Phelan and Baker Beaches, City and County of San Francisco, December 28-29, 1978

Department of City Planning with Environmental Impact Planning Corporation, Final EIR Westside Transport/Storage Project E.E. 75.304, July 1977

Department of City Planning with Wastewater Program and James E. Sutton, Final EIR Amendment E.E. 79.157, August 1979